

THE MANAGER

ENVIRONMENTAL HOT TOPICS

By Pete Wright

Manure storages can get too full and run over. Your job is to determine why and to prevent future overflows.

Don't cry over spilled manure; fix the problem

More than 10 manure storages overflowed in New York State during the spring of 2011. It's not surprising, given that this past spring was one of the wettest on record in much of the state. Still, an overtopping indicates that something failed – either the structure, the dairy's Comprehensive Nutrient Management Plan (CNMP) or management.

Storages are designed to handle a 25-year, 24-hour storm and the average rainfall for the storage period. An extended wet season, like we had, or an extreme event can cause overtopping. When that happens, it's prudent – and required for Concentrated Animal Feeding Operations (CAFO) by the New York Department of Environmental Conservation (DEC) – to evaluate the structure and its management to prevent both catastrophic failure and chronic discharges. As an aside, exceeding the maximum fill marker is a CAFO permit violation and a warning that management needs to change.



Storage overflow can cause erosion and vegetation damage on berms around earthen storages.

Step one

To evaluate why a storage overflowed, answer these four questions:

1. Has manure production increased due to herd expansion or other changes?
2. Were there extra inputs? These can come from a number of sources: Inside the barn, such as increased milking center discharges or waterer overflows. Outside the barn from failed clean water exclusions – diversions, roof water gutters or drip trenches. Or from dirty water drainage areas, such as barnyards runoff or silage leachate. Adding food waste to storage can also push the limits of its capacity.
3. Is the storage volume reduced by solids build-up? When crusts form on the top of storages or solids settle on the bottom and aren't removed, overall storage capacity decreases.
4. Was management lax in the fall and didn't get enough manure removed? Were opportunities to spread neglected? (See Frost Tillage, page 30)

Step two

If your storage has overtopped, assess it for damages. Check the berm on earthen storages that have overflowed or approached capacity. Heavy traffic can rut or displace soils saturated from high manure levels on the berm. This can create weak or low spots. High manure levels or manure flows may

FYI

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■ Consult the Cornell guide "Supplemental Manure Spreading Guidelines to Reduce Water Contamination Risk During Adverse Weather Conditions" to identify fields and procedures for emergency spreading to avoid overtopping. Find it at: <http://nmssp.cals.cornell.edu/publication/files/WinterSpreadingGuidelines.pdf>



The drainage system next to the wall of this concrete storage is vulnerable to contamination if the manure overflows. Notice the maximum fill level leaving room for the 25-year 24-hour storm.

compromise the vegetation, leaving the berm subject to erosion.

A concrete or steel structure may be less vulnerable to damage during overflows. But the drainage system next to the wall – clean gravel or sand that allows water to flow away from the wall – is vulnerable to contamination or plugging when a structure overflows. Evaluate the drainage system to check for contamination. As manure gets into the drainfill, it may not plug it but can continue to flow dirty water out of the drainage system.

Where necessary, flush and clean it. Repairs will ensure the system is functioning to keep the drainfill and the fill from being saturated and to prevent continuing discharges from manure in the drainfill.

If the drainage system plugs, it could cause a collapse of the structure's walls as the storage is emptied and the backfill remains saturated. Some flow from the system doesn't mean it isn't partially plugged.

Whether a storage is earthen or concrete, it's critical during



Sand has been used to attempt a repair of the berm of an overtopped manure storage. The storage is still vulnerable as the sand is easily eroded and permeable.

Don't let overtopping happen

We'll face a wet season again; consider some or all of these steps to prevent overflow:

- Have enough capacity in the storage for wet seasons.
- Add storage to the existing structure.
- Add satellite storages.
- Separate solids to decrease by 20% the remaining liquid that needs to be stored.
- Use a permeable cover to keep rainwater out.
- Monitor the levels in the storage so action can be taken sooner than later.
- Develop an emergency action plan.
- Select fields for emergency spreading when manure exceeds the storage's operating capacity. When possible, these "fields should be less than 5% slope and as far as practical from any stream or ditch, preferably at least 500 feet," according to the Cornell guide Supplemental Manure Spreading Guidelines to Reduce Water Contamination Risk During Adverse Weather Conditions.

cleanup to put the area back to ideal condition with erosion control and clean runoff in place. Repairs to the berm need to be blended into the remaining soil and properly compacted. If the storage is full during repair of the drainage system and the backfill is removed, the wall may fail.

Involve your engineer in these operations. The engineer can also help determine if other aspects of the storage have been damaged.

Who else needs to be involved if your storage overflows? Notify DEC. It will advise on cleanup requirements. Also, involve your CNMP planner to evaluate your need for storage and your management decision. □

Action steps

If your storage exceeds its maximum fill level requirements with overtopping, you must:

1. Lower the manure volume.
2. Report this in the 2011 Annual Compliance Report (ACR).
3. Consider a comprehensive review of your manure handling and storage system. If 2011 spring conditions are to blame, that may be it. Note this in the ACR. If cows have been added or other circumstances have caused the situation, you may need an in-depth adjustment to the CNMP.

If your storage has overtopped, you must:

1. Contain and remediate the spillage.
2. Lower the manure volume in the storage.
3. Report the incident to DEC.
4. Initiate a comprehensive review of your dairy's manure/nutrient handling system with a certified planner.
5. Have a professional engineer re-evaluate the manure storage structure.

Source: Douglas Ashline, New York State DEC, Division of Water, Bureau of Water Permits.